Part III

Recommended Final Scope

Draft Generic Environmental Impact Statement

Suffolk County Vector Control and Wetlands Management Long-Term Plan and Environmental Impact Statement

December 2, 2002

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RECOMMENDED FINAL SCOPE

1.0 Introduction

1.1 Definitions and Terms

Suffolk County Vector Control and Wetlands Management Long-Term Plan is the subject of this action. This is a management plan, based on the US Environmental Protection Agency National Estuary Program model. The management plan process is somewhat distinct from the Environmental Impact Statement process. The management plan process is indefinite in scope, as it is a process that may continually refine existing means of vector control based on new information. The Environmental Impact Statement process is foreseen as a defined, two-year process.

Vector control is the control of mosquitoes.

Vector Control Annual Plan of Work refers to the specific document produced by the Division of Vector Control of the Suffolk County Department of Public Works each year, which describes the means and rationales for the proposed plan of action in that year.

Open Marsh Water Management (OMWM) is a wetlands restoration technique based on management of water and water flows within the confines of the wetlands, and has an ancillary benefit of improved mosquito control.

1.2 Description of Scoping Process

Scoping is defined under the implementing regulations of the State Environmental Quality Review Act (SEQRA) as the process by which the lead agency, the Suffolk County Legislature in this case, identifies the potentially significant adverse impacts related to the proposed action that are to be addressed in the Draft Generic Environmental Impact Statement (DGEIS), including the content and level of detail of the analysis, the range of alternatives, the mitigation measures needed, and the identification of non-relevant issues. Scoping provides the preparers of the DGEIS with guidance on matters which must be considered and provides an opportunity for early participation by involved agencies and the public in the review of the proposed action [6 NYCRR Part 617.2(af)].

Scoping is optional under SEQRA, but when it is conducted it must include the opportunity for public participation. Based on the level of interest expressed by involved and interested agencies and the public, and the importance of the Suffolk County Vector Control and Wetland Management Long-Term Plan, Suffolk County decided that formal Scoping would be conducted, and that this process would include a public Scoping hearing.

A draft Scoping document was prepared by the Suffolk County Department of Health Services (SCDHS). The public Scoping process was initiated when that document, dated August 7, 2002, was circulated for public review, along with a number of associated documents, including:

- Request for Proposals (RFP), dated April 2002, issued by the SCDHS and the Suffolk County Department of Public Works (SCDPW);
- Amendments to the RFP, dated May 24, 2002, issued by the SCDHS;
- Draft work plan, as set forth in the selected project consultant Proposal, dated June 17, 2002;
- Amendments to the draft work plan, as set forth in the project consultant Addendum to Proposal, dated August 12, 2002; and,
- 2002 Annual Plan of Work for the SCDPW Division of Vector Control.

A public Scoping hearing was held on September 10, 2002 at the Suffolk County Legislative Building in Hauppauge. This hearing was conducted by the Committee on Environmental Quality (CEQ), acting on behalf of the County Legislature as authorized by Chapter 279 of the Suffolk County Administrative Code.

The Steering Committee established to oversee the preparation of the Long-Term Plan and the DGEIS conducted a public meeting (in conjunction with the project Technical Advisory Committee [TAC]) on September 17, 2002 at the Suffolk County Legislative Building in Riverhead. Although this meeting was directed at discussing the draft project work plan, and technically was not a SEQRA Scoping session, statements that were made at the joint Steering Committee-TAC meeting at that time have been included among the issues considered in finalizing this Scoping document.

The CEQ held open the public Scoping record until September 25, 2002, in order to afford the opportunity for additional written comments regarding the scope of the DGEIS. All written comments received through that date, as well as minutes and summaries from the various meetings conducted as part of the Scoping process, have been collected together into a single volume, which has been distributed to involved and interested parties. Substantive Scoping issues identified among these comments have been synopsized, and a detailed response has been prepared for each such comment.

Based on substantive Scoping comments that have been received by the County, the scope of the DGEIS has been amended appropriately. The revisions are identified in the following section of the present document.

1.3 Synopsis of Major Areas of Change from the Draft Scope

Based on review of the comments received during the public scoping process - as discussed during a series of technical meetings involving the SCDHS, SCDPW, CEQ,

and project consultant - the final scope of the DGEIS will include a number of substantive additions and revisions, as compared to the draft Scope. These major areas of change are enumerated below, and elaborated upon in the appropriate sections of this final Scoping document. Further detailed discussion of these issues is provided in a separate Responses to Scoping Comments.

In addition to the issues that were included in the draft written scope that was the subject of the public scoping hearing on September 10, 2002, the DEIS also will address numerous additional substantive issues and topics raised during the public scoping review. A summary of the most significant issues follows:

1. a brief mission statement has been developed which summarizes the primary goals and objectives of the Suffolk County Vector Control Program;
2. examination of the distinction between the control of mosquitoes in response to quality-of-life considerations (also characterized as nuisance impacts) versus the protection of public health;
3. appropriate discussion and analysis of the State and Federal West Nile Response Plans and their implications with respect to the Suffolk County Long-Term Plan;
4. analysis of impacts to non-target species (i.e., species, other than the mosquitoes, that are the inadvertent target of the County vector control efforts), including both terrestrial and aquatic species;
5. establishment of meaningful guidelines (i.e., thresholds) for determining the specific circumstances under which the County will employ pesticides for mosquito control;
6. analysis of the efficacy of pesticides in controlling mosquito populations;
7. comparison of the effectiveness of ground-spraying versus aerial spraying in controlling adult mosquito populations;
8. evaluation of the relative contribution made by the Suffolk County Vector Control Program with respect to overall pesticide loading to the environment in Suffolk County;
9. analysis of the impacts of Suffolk County Vector Control pesticides on sensitive segments of the human population, including pregnant women, fetuses, the immune-compromised and children;
10. enhancement of relevant training provided to Suffolk County Vector Control personnel;
11. identification of measures to improve public notification regarding pesticide spraying by Suffolk County for mosquito control;
12. possible additional early-action field experiments, including a number of investigations suggested by the New York State Department of Environmental Conservation (NYSDEC), such as caged fish and fate and transport studies;
13. possible inclusion of additional sources of information outside of those already identified in the work plan, including newspaper accounts;
14. evaluation of non-chemical controls for mosquito management;
15. evaluation of stormwater control systems in mosquito proliferation and the promotion

of mosquito-borne disease;
16. investigation of the possible confounding effect that recent stormwater mitigation initiatives, especially augmented stormwater retention for contaminant abatement, may have on the selected control program;
17. evaluation of the local exposure and infection rate for West Nile virus and other mosquito-borne diseases;
18. review of existing regulatory programs pertaining to wetland management and pesticide evaluation;
19. assessment of the potential effect that pesticide application by the Suffolk County Vector Control Division may have on the levels of pesticides in foods, including both the human exposure levels involved and implications with regard to organic farming; and,
20. inclusion of the Orient Mosquito Control District within the geographic area of the study.

1.4 Synopsis of Comments Not Causing Major Changes in the Draft Scope

Certain topics raised in comments on the Draft Scope did not result in major changes. These included:

1. changes in the membership of the Technical Advisory Committee and the composition of the Consultant Team;
2. creation of an independent budget for the Citizens Advisory Committee; and,
3. accurate definition of the role of the NYSDEC in the project.

Other specific comments received through Scoping (the comments, meeting minutes and Scoping Hearing Transcript total 310 pages) were deemed to be included in the above topics, included in existing topics of the Draft Scope, or not germane at this time.

2. Overview

2.1 SEQRA Considerations

This document is the final scope for the Draft Generic Environmental Impact Statement (DGEIS) for the Suffolk County Vector Control and Wetland Management Long-Term Plan. This will be a Generic EIS, consistent with the provisions of 6 NYCRR Part 617.10(a) of the SEQRA regulations, since the proposed action represents "an entire program or plan having wide application or restricting the range of future alternative policies or projects." According to that same section of the SEQRA regulations, a GEIS:

- "may be broader and more general than site or project-specific EISs," but "may also include an assessment of specific impacts where such details are available;"
- "may be based on conceptual information in some cases;"
- "may discuss in general terms the constraints and consequences of any narrowing of future options;" and,
- "may present and analyze in general terms a few hypothetical scenarios that could and are likely to occur."

The subject DGEIS will cover all future activities by Suffolk County to control mosquito populations in the County, within the context of a long-term management plan. The annual Vector Control Plan of Work that has been prepared by the County to undertake its mosquito control program for 2002 (and which is expected to be prepared for 2003) will be discussed in the DGEIS to provide relevant historical perspective. However, these annual Plans of Work will not serve as the basis for formulating the Long-Term Plan (see section 2.3, Management Plan Approach) and should not be confused as such.

Unless otherwise specified herein, mosquito control activities by entities other than Suffolk County, including commercial applicators, private individuals, and other public agencies, will not be addressed in the Management Plan (although impacts from those activities will be addressed in the DGEIS). The only exception is the Orient Association, covering the Hamlet of Orient on the North Fork at the East End of Suffolk County, which currently undertakes mosquito control as a special district operating independently of the SCDPW.

2.2 Mission Statement

The overall objective of the project will be to develop a long-term, Suffolk County-wide Vector Control and Wetlands Management Plan. The plan will protect public health, while minimizing pesticide usage and optimizing environmental quality. As part of the program, wetlands management will be implemented insofar as such management is relevant to the control of mosquitoes, while minimizing adverse impacts to the wetlands.

The program will be based upon program and literature reviews, field reconnaissance, and impact assessment (including public health and ecological risk assessments). A detailed evaluation of alternatives will be performed, including cost-benefit analyses. Examples of possible recommendations include:

- Specifications of allowable chemical usage (types, application rates and methods, etc.) to optimize ecological protection while protecting public health;
- Implementation methodologies for non-chemical vector control methods;
- Detailed descriptions of treatment areas (exact locations, setbacks for particular applications, etc.);
- Guidelines for wetlands restoration activities, such as Open Marsh Water Management (OMWM);
- A comprehensive education and outreach program; and
- A framework for future monitoring and management.

2.3 Management Plan Approach

It is important to recognize that the proposed action, which is the subject of the DGEIS outlined in this scoping document, has not been formulated as yet. The annual Vector Control Plan of Work for 2002 is being implemented on an interim basis until the Long-Term Plan and associated GEIS have been completed. The CEQ and the Legislature will consider approval of scaled-back scopes of work during the Long-Term Plan preparation process.

Suffolk County has decided to undertake a management plan approach to developing its new Long-Term Plan for mosquito control and wetland management. This approach follows the model that was used so successfully by the SCDHS in the Peconic Estuary Program, in conformance with the US Environmental Protection Agency National Estuary Program model, whereby there is no preconceived end product, and the plan evolves from a broad-based consensus derived from a comprehensive analysis of existing conditions and evaluation of a wide range of feasible alternatives. The precise details of the Long-Term Plan that will become the proposed action will not be known for many months, and will involve review by and input from the Steering Committee, CEQ, Technical Advisory Committee, and Citizens Advisory Committee. The Long-Term Plan will be constructed piece-by-piece through a set of discrete tasks which will be specified in the final project work plan, with each such piece being scrutinized by technical and regulatory experts, and by interested citizenry in an open, public forum.

2.4 Scope of the Wetlands Management Component of the Long-Term Plan

Marsh management issues will be addressed in the DGEIS only to the extent that such issues relate specifically to the Suffolk County mosquito control program. It is not

intended that the Long-Term Plan (or the DGEIS) incorporate a general wetlands management program. Instead, the Long-Term Plan will examine the degree to which water management and chemical application practices undertaken by Suffolk County for the specific purposes of mosquito control may enhance or adversely impact the ecological quality and other important environmental characteristics of the affected wetlands.

3. Brief Description of the Proposed Action

3.1 History of Suffolk County Vector Control

To control mosquitoes that transmitted malaria (several hundred cases a year) and impacted quality of life throughout much of the County, in the 1930s Suffolk County initiated a formal mosquito control program. The program included marsh management (primarily, ditching and filling) and chemical elements (smothering oils). Following the WPA-fueled initial burst of ditching, water management has largely been restricted to maintenance of the 660 miles of ditches that were installed throughout wetlands in the County (primarily in salt marshes, but including portions of freshwater streams). After World War II, the development of broad-spectrum chemical insecticides (such as DDT) created an adulticide element for the program. Since that time, as less toxic and more targeted pesticides have been developed, the County has adapted its chemical control program.

Currently, the Division of Vector Control in the Department of Public Works has approximately 50 full-time employees. It conforms to the following hierarchy, based on the principles of Integrated Mosquito Management, in its operations:

- Prevention through public education
- Surveillance to determine mosquito presence and health threats
- Water management (including ditch maintenance) as a source control
- Biological controls where appropriate (e.g.,stocking mosquitovorous fish)
- Larval control (using compounds such as Bti [since 1982] or methoprene [since 1995], or the bacterial product Vectolex [since 1998])
- Adult control (primarily using pyrethroids through ground [truck or backpack] applications)

Additionally, the County has a West Nile Virus Response Plan to be implemented if it is determined human health might be at risk from West Nile virus. Although the elements of the County's Vector Control Plan outlined above are expected to minimize West Nile virus incidence within the County, if the threat emerges the County takes vigorous steps to address the disease potential. The primary means of controlling mosquitoes that threaten human health is aerial application of adulticides (primarily pyrethroids).

On October 18, 2001, the SCDPW submitted a 2002 Vector Control Plan of Work and associated Environmental Assessment Form (EAF) to the CEQ. After extensive review and public comment, the SCDPW amended the 2002 Plan of Work, reducing the scope of work to be done during 2002 in order to reduce any potential environmental impacts below the SEQRA threshold for determining significance.

The SCDPW subsequently prepared a separate EAF for the development of an

expanded Vector Control and Wetlands Management Long-Term Plan. This EAF was submitted to the CEQ on May 2, 2002. On May 15, 2002, the CEQ issued a recommendation for a Positive Declaration to the Suffolk County Legislature. The Legislature issued the Positive Declaration at its meeting on August 6, 2002.

3.2 The Management Plan Process

To develop a management plan for vector control, the SCDPW and SCDHS issued a Request For Proposals (RFP) seeking consultant services. Because the Division of Vector Control expends much of its effort in water management in salt marshes, a wetlands management component was explicitly included in the management plan proposal. The SCDHS developed the RFP and was selected to manage the program, because of its extensive responsibilities and experience in coastal and wetland environments, the public health aspects of the project, and due to the expected need for analytical services to generate information (the County PEHL laboratory is part of SCDHS).

The consultant developing the management plan will conduct an extensive literature search, contact appropriate experts in appropriate fields, collect, process and analyze existing data from County and other sources, select and conduct appropriate experiments and pilot projects, identify a preferred vector control strategy, and then analyze the risks associated with the control of mosquitoes to those associated with alternate management means and a “no-action” alternative. The management plan will include a long-term monitoring program to continuously evaluate the program over time, and to generate data to fill identified information gaps, thus generating rationales for improvements to the selected approach. All aspects of the current County vector control strategy will be re-evaluated and scrutinized through this process.

The development of the management plan will be overseen by a Steering Committee, composed of representatives from the County Executive, the Presiding Officer of the County Legislature, the Commissioners of SCDPW and SCDHS, the Commissioner of NYSDEC, and the Chair of the CEQ. The Steering Committee will be advised by a Technical Advisory Committee, a Citizens Advisory Committee, and, acting as project manager, SCDHS Division of Environmental Quality.

3.3 Legal and Regulatory Setting

Suffolk County is authorized to conduct mosquito management under New York State Public Health Law Article 15 (Sections 1500, 1501, and 1502) and Section C8-4 of the Suffolk County Charter (part 380 of the Suffolk County Code). Each year, the Annual Plan of Work undergoes SEQRA review through the CEQ (acting as advisor to the County Legislature as Lead Agency). Permits relating to aquatic pesticide applications are issued by NYSDEC (unless waivers for public health emergencies are received).

Some wetlands management activities require permits from NYSDEC, and, potentially, the US Army Corps of Engineers (USACOE). Activities in the coastal zone require a Consistency Review from the New York State Department of State (NYSDOS). Work conducted in the Fire Island National Seashore and several National Wildlife Refuges requires review under the National Environmental Policy Act and may require federal special use permits.

As part of the management plan development, the laws and regulations affecting vector control and associated wetlands and stormwater management will be clearly identified and discussed. This specifically includes the National Environmental Protection Act (NEPA), as it applies to Vector Control activities in areas that may require Federal permits (such as the Wildlife Refuges and the National Seashore). One concern in particular will be to determine if this GEIS process under SEQRA meets NEPA requirements, or how the output of the SEQRA process would need to be modified to address NEPA.

Furthermore, the management programs established for the three estuary programs (the Long Island Sound Study, the Peconic Estuary Program, and the South Shore Estuary Reserve) affecting Suffolk County will be reviewed for consistency with any potential vector control management program.

3.4 Information to be Used in the Development of the Plan

In order to develop the Management Plan and associated GEIS, a great deal of information will be required to be collected, analyzed, and explicated. The information can be understood to relate to five broad categories of investigation:

- Description of the Issues
- Environmental Setting
- Mosquito Management
- Mosquito Control Impacts
- Potentially Confounding Issues

The following briefly describes the kinds of information that will be sought in these various categories. The means of acquiring the information are described in Section 5.

3.4.1 Description of the issues

The information collected will determine a rationale for the prospective Suffolk County vector control program. Current mosquito species found within the County will be cataloged. Their lifecycles will be detailed, and geographic distributions will be described, based on historical data from Vector Control records as well as other sources of naturalist data. Current local human health

concerns, based upon sampling data from mosquito pools and available health department and hospital records will be established. At this time, Suffolk County mosquito-borne human health threats appear to be limited to eastern equine encephalitis and West Nile virus. Based upon reasonable expectations of health experts, the likelihood of invasions of other diseases (such as but not limited to malaria) will also be explored.

These factors will be combined with national data sets and projections to create a risk profile for mosquito-borne diseases for Suffolk County. While this risk profile will not be limited to historical data, the time frame of the analysis will be limited so that speculation does not become the controlling variable in assessing the risk.

A description of mosquito presence on Long Island prior to organized mosquito control efforts will be made. This will be supplemented by experiences of reduced control efforts in sections of the County or nearby jurisdictions to determine the results of a cessation of the County mosquito control program (in terms of mosquito prevalence and behaviors). The rationale for controlling mosquitoes that may limit outdoor activities and access will be carefully explored. Differences in uses of various types of land throughout the County (residential areas, parklands of various kinds, the few remaining extensive tracts of undeveloped lands) will be factored into this analysis.

Estimates of ecological impacts from mosquito-borne diseases, especially that of West Nile virus on bird species diversity and populations, will be made. Currently available information may not allow for a complete description of this potential problem, but it will be described as well as is possible given the evolving state of knowledge.

3.4.2 Environmental setting

The information gathered will portray the County in terms of mosquito and mosquito-management concerns. The general ecosystem associated with mosquitoes will be detailed, in terms of predator-prey interactions and energy and trophic foodweb considerations. Other important ecological subsets that might be impacted by mosquito control activities (such as wetlands and inshore environments) will be described. As best as can be determined, changes in mosquito ecological roles associated with West Nile disease impacts will be drawn.

One focus will be on wetlands, since they serve as prime mosquito habitat. Trends in wetlands extent and health will be discussed, including impacts from anthropogenic activities (such as dredging and filling) and other impacts that are

not so clearly correlated to human interventions (such as *Phragmites* spread). A subset of wetlands will be carefully described to serve project-specific needs, but also to create a baseline monitoring data set to assist in the evaluation of the effects of the adopted management plan.

Large, complex, and growing databases have been generated by monitoring programs associated with the Long Island Sound Study, the Peconic Estuary Program, and the South Shore Estuary Reserve Program. There are also extensive data sets relating to Suffolk County groundwater and surface water quality. These will be collated to establish baseline water quality for future impact assessments, and also to determine if impacts from current management efforts can be detected. On-going research efforts will also be applied to fill some of the data gaps that exist.

Although many water management projects proposed for the County are still waiting for regulatory approvals, some projects in Wildlife Refuges have been initiated and are the subject of current federal monitoring efforts. The data from these projects will be used along with any project-specific information to derive a water management program to achieve vector control.

The current state of stormwater management in various regions and jurisdictions of the County will be described. The potential for these systems to serve as mosquito habitat will be detailed, and impacts from likely changes to be adopted under US Environmental Protection Agency (USEPA) Phase II regulations will be projected. Improvements anticipated to result to local water quality from implementation of the new regulations will also be discussed.

The information collected in this environmental setting description will determine the scope of the ecological impact assessment for the proposed plan and its evaluated alternatives.

3.4.3 Mosquito management

Information on all aspects of mosquito management will be collected. The management plan process is most successful when all reasonable alternatives are actively considered and evaluated. This broad consideration of alternatives assures the public, the regulatory community, and interested technical parties that their particular concerns have been considered and rationally evaluated. Therefore, it is very important to seek all potential means of addressing the issues at hand.

The study will begin by completely describing the current methods and extent of mosquito management as conducted by the County Vector Control Division.

Close analyses will also be made of nearby programs, especially in Nassau and Westchester Counties, New York City, in the State of Connecticut, and some of the jurisdictions in New Jersey. This information will begin to describe some of the alternatives to be evaluated in creating the management plan.

However, the information gathering will not be restricted to local programs. All aspects of an integrated mosquito management program will be completely evaluated. These include:

Mosquito prevention

Public education efforts will be assessed to determine what aspects tend to be successful, and what efforts do not appear to be very effective. Local factors (large numbers of pool covers and bird baths, but a general lack of rutted dirt roads and animal water troughs) will be essential in assessing how residents can be directed to minimize mosquito breeding opportunities.

Mosquito surveillance

Mosquito surveillance can be conducted to assess populations, vector potential, breeding areas, migration routes, and effectiveness of control measures. The surveillance can be direct by trapping mosquitoes, or indirect by monitoring impacts on mosquito target species (crows, for example). Surveillance information will be used to: (a) generate the management program; and (b) supply necessary information to conduct appropriate mosquito control. Existing data from County and other sources as well as project-derived information will be accessed.

Water management

Manipulation of the environments that generate mosquitoes holds great promise to reduce mosquito numbers. Historical techniques such as ditching will be evaluated along side more modern notions such as OMWM and less extensive approaches such as ditch plugging and natural reversion. Each of these techniques will be appraised in light of County-wide hydrological variations and in terms of risks to marsh functionality.

Mosquito predation

In some ecological niches, top-down control of mosquito populations has been shown to exist. The potential for controlling mosquitoes by predation will be investigated. Means of augmenting predator populations without disturbing essential ecosystem balances will be detailed, including habitat improvement (as minimal as bat and bird houses, to major efforts such as OMWM) and stocking efforts.

Stormwater engineering

Upland stormwater systems are almost certain to be assessed as significant habitats for mosquitoes (including some species that are important in transmitting human diseases). At this time, stormwater engineering does not include mosquito prevention as a design parameter. Information will be generated to evaluate alternatives to current design practices to determine what trade-offs (if any) are necessary in considering both water quality and mosquito control goals.

Larvicides

Commonly used larvicides will be discussed in terms of relative effectiveness, environmental persistence, and the potential for generating mosquito resistance.

Adulticides

Several classes of adulticides will be examined. These include chemical pesticides, and here the focus will be on the pyrethroids used in the County of late -- although other commonly used pesticides will not be excluded. Traps will be discussed, including methodologies that increase the effectiveness of their deployment. Aversion substances (such as garlic oils) that drive mosquitoes away from a particular site, as well as other non-pesticide control means, will also be included in the analysis.

The information collected for this portion of the study will focus on relative effectiveness, environmental persistence, and the potential for generating mosquito resistance.

Control measure effectiveness

Information will be collected on the needed efficiency of mosquito removal in order to achieve the ends sought by County vector control efforts. Then, the ability of the control measures to achieve these standards will be assessed. The analysis will include the techniques as stand-alone efforts, but also as elements of an integrated program. Part of the analysis will include determinations of the differences between delivery systems (such as truck versus aerial releases).

3.4.4 Mosquito control impacts

The mosquito control measures will further be evaluated in terms of their potential impacts to human health and the environment. The initial evaluation of these impacts will be primarily qualitative rather than quantitative, although quantitative assessments of impacts will be made where feasible.

Human health impacts will be evaluated in terms of potential negative effects (acute, chronic, synergistic, and cumulative) of chemical controls on sensitive populations such as children, the immune-compromised, and pregnant women. Exposure pathways will include direct uptake from contaminated air, water, and

soil (including pathways such as tracking materials into homes), but will also include indirect paths such as exposures from local fruits and vegetables that may have been sprayed while in the field.

Human health exposures from chemicals potentially to be used in vector control will be contrasted to potential exposures (and risks) associated with other pesticide usage in the County (such as licensed applicator applications, and, insofar as they can be tabulated, agricultural and homeowner pesticide use).

It should be stressed that the control measures need to be evaluated as being sufficiently protective of human health in terms of current and potential disease impacts. West Nile virus will certainly be among the mosquito-borne diseases that must be adequately protected against through the selected management plan. Additionally, the plan should also address the quality-of-life concerns sufficiently well to meet County needs.

Ecological and environmental impacts will also be carefully evaluated. The two primary areas of concern are wetlands and non-target species.

Wetlands will primarily be evaluated in two ways. One is in terms of general health. This is a measure of the wetland continuing to both be productive and to maintain itself in the face of changing environmental stressors. The other is in terms of wetland functionality. Functionality has to do with the wetland continuing to achieve the environmental benefits of this kind of habitat, including acting as a nursery for important commercial species, sediment and water management, and achieving expected productivity levels. An analysis of wetland functionality will include wetland ditches, since existing ditches may act as a conduit for nonpoint source stormwater runoff to wetland communities. For purposes of the GEIS, the wetlands analyses will be based on the literature survey and early results from any appropriate field studies.

A host of non-target species, including larval forms, will be evaluated. Marine organisms, including invertebrates and commercially-important species (clams, lobsters, crabs, fish), especially those found in wetlands or coastal waters, will be of special concern. Endangered species, including turtles, will also be evaluated. Affected insects other than mosquitoes will be identified for each control measure, and the degree of the impact on the population and associated foodwebs will be described. Birds are also of particular concern, especially those that depend on wetlands (where most impacts from vector control activities are assumed to occur). Indirect impacts on insectivores will be assayed, due to the removal of mosquitoes and other potentially-impacted insects from the food chain. Additionally, impacts on pets from the chemical controls will be determined (both as sentinels for human impacts, and as significant species in-

and-of themselves).

3.4.5 Potentially confounding issues

The selection of a management plan will be complicated by certain issues. At this time, there is not enough information to adequately assess the degree to which the plan as a whole may or may not be impacted by any of the potential confounding issues identified below (as well as others that may be uncovered in the course of the study):

The human health risk from West Nile virus is found to be insignificant
Current vector control practices in the U.S. and on Long Island are based in part on West Nile virus posing a substantial risk to human health. It has been asserted in some comments that this is not the case. Mosquito control measures may be altered if West Nile virus is determined to be an insignificant threat to human health.

The need for "nuisance control" of mosquitoes cannot be demonstrated
Suffolk County controls mosquito populations to minimize human health risks. However, there has not been an ability to systematically separate "public health risk" and "public health nuisance" from pure "nuisance," i.e., the discomfort mosquito bites represent to affected populations. It has been asserted there may be no need to continue mosquito control practices because either the public health problem is minimal, or that the practice of controlling mosquitoes (especially with chemicals) actually exacerbates the problem (through the generation of resistant mosquitoes or by altering overall mosquito ecology).

Data quality problems.
Data available to examine important issues in this study may not be adequate to assist in making the required judgments. This may be true for older scientific data sets, such as those measuring wetland trends or mosquito management effectiveness, accounts of life on Long Island prior to organized mosquito control, or stories collected that relate impacts from exposures to chemical controls. Synergistic effects are usually determined through models, and these models (and therefore, their output) may or may not adequately reflect reality. This may also be the case for determinations of cumulative impacts. It has also been suggested that the study consider impacts ecosystem-wide. However, published work is unlikely to be specific enough to address many of the concerns that will arise in this study so as to allow for projections from particular impacts to more general ecological concerns.

Unavailable data/lack of pertinent studies
Many of the potential impacts of control techniques, including particular

chemicals and wetland management techniques, have never been assessed. Some have been assessed, but it may be that the conditions of concern for this study were not measured. This creates major difficulties, especially in creating quantitative assessments of risks and impacts. Certain important issues, such as future threats from mosquito-borne diseases, are extremely difficult to forecast based on current information bases. Local studies, or studies on systems similar enough to those found in the County, may not have been conducted on particular elements of the impact assessments.

Biased data sources

Some may perceive important data sets as inextricably biased because of the means by which they were generated. Much of the information available on pesticide impacts, for example, has been generated by pesticide manufacturers (or their representatives) for the purpose of government registrations. Most of the local information on mosquitoes and the impact of mosquito control measures has been collected by the County Vector Control unit. A great deal of the site-specific information on OMWM has been gathered by supporters of the technique.

Laboratory shortcomings

Some of the chemicals of interest in this study (such as metabolites or break-down products) have never had analytical methods developed to allow for their measurement. Others have not had media-specific methods developed. Another important issue is that these compounds are often present in the environment at exceedingly small concentrations (parts per trillion or even less), and so measurements at this level can be extremely difficult or even impossible to make without serious contamination or matrix problems.

Data gaps for non-standard control techniques

Many non-standard control techniques, because they have not been adopted by major mosquito control programs, lack data sets on efficacy or potential impacts that are equivalent in size and scope to more standard control mechanisms. That these techniques have not been widely implemented by agencies may also mean there is no regulatory approach in place to allow general implementation of the alternative.

Time/site limitations for experiments/pilot projects

This project includes the potential to conduct experiments and/or pilot projects to supplement the existing database for important project aspects. However, there are certain limitations to these efforts. The project is expected to extend over two years; that may not be adequate to determine impacts in slow-reacting environments, or may be strongly affected by confounding factors (weather is the most obvious) in the short-term. Other issues involve the ability to receive

permits to work at particular sites, or the time required to identify the most appropriate site for particular work.

Policy contradictions
For example, current USEPA regulations stress treatment of stormwater to minimize coliform counts and sedimentation in receiving waters. The preferred control techniques for those problems (stormwater retention and detention) may increase mosquito breeding sites. Therefore, a mosquito control plan may run astray of a water quality initiative. It is also clear that very important policy determinations may need to be made regarding human health risks and environmental impacts, or on human comfort versus environmental impacts or long-term health risks. Some of these issues may require legal and regulatory adjustments, as well as evaluations of costs and benefits.

3.5 Information to be Included in the Body of the Document and in Appendices

The content and range of the investigations that are needed to discuss this project and its potential impacts promise to result in a long and very detailed Impact Statement. In order for the DGEIS to be physically manageable, data presentations in the body of the document would appear to need to be limited to summaries and data distillations of various sorts. However, as it is the intent of the County to maximize public involvement and understanding of this project, it is anticipated that all data sets used in the project will be made available to the public. This will be accomplished through the publication of task reports associated with the management plan generation, through web site postings, and through extensive appendices to the DGEIS.

3.6 Information Likely to be Unavailable for this Study

As discussed above in Section 3.4.5, there are unavoidable aspects to this problem and process that make it probable that some of the information that might be desired to complete this study will not be available at the end of the projected eighteen-month DGEIS process (January 2003 to June 2004). Those factors, discussed in detail in Section 3.4.5, include:

- Data quality problems.
- Unavailable data/lack of pertinent studies
- Laboratory shortcomings
- Non-standard control techniques data gaps
- Time/site limitations for experiments/pilot projects

The time limitations for field work and experiments will most certainly limit the information that can be included in the DGEIS. Most wetland manipulations require years of monitoring to produce the most useful kinds of data. Therefore, although these

experiments will be initiated during the DGEIS process, and may generate some preliminary (and interesting) data, they will not produce the type of information that can guide management decisions for several years after the completion of the DGEIS. Therefore, it must be understood that completion of the EIS on the Long-Term Plan will not be contingent upon completion of all of the activities associated with the management plan process that will ultimately refine the County's mosquito management plan.

4. Potentially Significant Adverse Impacts from the Developed Plan

This section of the scope must be understood in the context that the action being analyzed is the development of a Long-Term Plan, and so certain components of the action have not yet been identified. However, the following issues have been evaluated as most certainly requiring scrutiny and further analysis to fully determine the impacts of whatever management plan is adopted. Additionally, the potential for impacts (see Section 3, above) will be continuously monitored as program components are considered and evaluated.

4.1 Human Health Impacts from Control Techniques

Some human health impacts could be associated with one or more components of the Long-Term Plan. The most significant potential impacts appear to be those that relate to the use of chemicals for mosquito control. Although it has not yet been determined that the County program will indeed use chemicals as part of the Long-Term Plan, it appears to be likely (given that nearly all United States mosquito control programs use chemicals as part of their program).

Therefore, it is anticipated that impacts from the use of chemicals to control mosquitoes will require discussion. These include potential impacts from exposure to both larvicides and adulticides. The entire suite of chemicals recommended for use under the Long-Term Plan will be included in any analysis. The determination of risks from the chemicals will be in terms of acute effects, and also those that are chronic, and include carcinogenesis as well as sublethal effects; the synergistic and cumulative effects of these chemicals will also be evaluated. Exposure data will draw from single and repeated doses. Populations normally considered to be at greater risk from infections (such as children) and other identified groups (such as fetuses) will be included in all determinations of overall health risk (as a general rule, risk analyses use uncertainty factors to account for groups that are more at risk than the populations that may have been used to conduct the quantitative analysis). The determination of risk will include direct pathways (contaminant exposure through air, water, and soil) but also indirect exposures based on chemical accumulation on and in local vegetables and fruit.

4.2 Ecological Impacts from Control Techniques

The initial analysis has identified three major areas of concern:

- Impacts associated with wetlands management
- Impacts associated with non-target species
- Impacts associated with stormwater management

4.2.1 Wetlands management

Great changes occurred to wetlands on Long Island in conjunction with past and on-going mosquito management. At its most extreme, prior wetlands management to control mosquitoes included dredging and filling of the wetlands to destroy them. Another major effort was extensive ditching of marshes to manipulate water levels, in hope of reducing mosquito breeding habitat. The County has continued this effort with nearly 70 years of ditch maintenance.

More recent efforts have centered on undoing at least some of the effects of ditching, through OMWM, ditch plugging, or ditch reversion. Because these manipulations are intended to affect water levels on the marsh, may change sedimentation patterns, and could alter patterns of marsh vegetation, they are likely to have impacts on the wetlands. These impacts will be evaluated through the generic marsh parameter of "health." This term is intended to signify the likelihood of continued wetlands persistence, and its continued ability to provide the ecosystem values that wetlands are prized for: nutrient and sediment sequestration, nursery refugia and general habitat values, and serving as a buffer between open water and the land.

It is likely that major changes in the wetlands will be reflected in both marine and terrestrial ecosystems (although the impacts to the marine environment may be more significant). These potential impacts will be traced and discussed as to the extent possible.

4.2.2 Non-target species impacts

It is likely that all active control measures (larviciding and adulticiding, including non-chemical approaches such as insectivorous fish, garlic oils, and traps) will have direct impacts on trophic food web interactions and species other than mosquitoes. These impacts may result from the control measure itself, or its means of application.

Marine organisms, in particular benthic invertebrates, are believed to be more susceptible to the kinds of chemicals used for mosquito control than most other kinds of organisms. Therefore, all such proposed applications will be carefully scrutinized for their impacts on benthic invertebrates, direct impacts on other marine organisms, and indirect food chain impacts as best as can be determined. Potential impacts to commercial species such as clams, lobsters, and crabs will also be evaluated. Potential impacts to endangered species, including turtles, will also be evaluated.

Another kind of organism likely to suffer from non-target impacts is insects. It is not clear if previous impact assessments of mosquito control have carefully

delineated the collateral damage that may occur in other insects. Some control techniques are rather discriminating in the species that they affect, but others are not. Differentiation between the impacts on insects for the proposed control means will be useful in determining their overall environmental impacts.

Historically, some insecticides (DDT is the most well-known example) have had major non-target impacts on avian species. The current suite of chemical controls will be evaluated for their impacts on birds. This will include an evaluation of the impacts of overflights at marshes on nesting and resting birds.

The reduction in the number of mosquitoes (and, probably, other insects) due to control activities may cause secondary impacts on insectivorous species. These include birds, fishes, other marine organisms that may prey on larvae, bats, and larger insects (dragonflies may be a species of particular concern). Efforts will be taken to trace the overall ecological impact of the removal of prey from a system, including an assessment of the likelihood of reinforcement of boom-bust population tendencies.

Finally, impacts on household pets (predominantly, animals such as dogs and cats that may move from indoors to outdoors) will be made. Pets may serve as human impact sentinels, for one (there is a movement to map pet cancers as surrogates to assist in identifying environmental cancer causes in people), but they also may be susceptible to impacts due to lack of concern for exposure, and increased risks along certain routes of exposure (such as household dirt or synthetic rug fibers).

4.2.3 Stormwater quality issues

Stormwater control structures may comprise significant habitat areas for upland mosquitoes (some species of which represent major disease vectors). It may be that adequate control of these vectors requires re-engineering of existing or proposed stormwater management systems. Many of these systems are now designed to minimize coliform and sediment impacts on waterways through retention and detention of water. If these structures are re-engineered strictly for mosquito control, the potential for diminished treatment capabilities exists.

4.2.4 Adverse impacts from inadequate control of mosquitoes

Potential adverse impacts also would occur if the plan does not adequately control mosquito populations, primarily including an increase in disease threats. These potential impacts need to be evaluated both in terms of current disease threats, and, as best as can be determined, in light of likely future disease threats.

Another major issue may be the environmental consequences brought on by West Nile virus. This virus appears to be having substantial impacts on over 100 bird species throughout the United States. Thus, if the mosquito control program did not sufficiently control West Nile virus, impacts to many avian species might

be experienced in Suffolk County.

Finally, potential economic impacts to tourism and outdoors-related businesses will be estimated, if it is shown that inadequate mosquito control may reduce visitors or the amount of time visitors and residents spend outdoors.

5. Extent and Quality of Information Needed to Address Potentially Significant Impacts

5.1 Literature Search

In order to develop the best Long-Term Management Plan, it is essential to review the collective experience of vector control experts and researchers in related environmental and human health disciplines. Experts from mosquito control programs and scientists in fields such as mosquito ecology, mosquito-borne diseases, wetlands management, chemistry, marine toxicology, epidemiology, and human and ecological risk assessment from local and other universities have been asked to join the consultant team. This team of experts will perform detailed searches of the scientific, medical, and public health literature. Major databases such as Medline and ToxLine, as well as scientific databases available through the SUNY Stony Brook library, will be used to find the most recent publications relevant to this project. Federal government documents accessible through the National Technical Information Service will be searched, including those of USEPA and the Centers for Disease Control. Current information on vector biology and management strategies will be taken from scientific journals in the field.

The study will also evaluate peer-reviewed and gray literature and other materials including theses, agency and non-governmental organization reports, and information available from these agencies and organizations over the Internet.

5.2 Data Compilation

An extensive mapping and data compilation effort will be performed to expand the County's Graphic Information System (GIS). A complete, easily referenced data source of operational information and mosquito breeding sites is essential to the development of an effective Long-Term Management Plan. The review will cover all existing operations and GIS data of Suffolk County Division of Vector Control. This information will be loaded according to the GIS database design approved by Suffolk County. Existing Suffolk County Division of Vector Control point coverages will be loaded including:

- Major mosquito breeding sites
- Areas subject to adulticiding (1999-2002)
- Surveillance sites

Existing digital operations data will be loaded including:

- Pesticide application records (1997-2002)
- Adult mosquito population data (1997-2002)
- No-spray address list

Data entry will be performed for the mosquito breeding records. GIS polygon (area) layers will be created depicting these data sets, as well as existing water management structures (e.g., culverts and ditches) and County Vector Control Management Areas data.

Wetland mapping efforts performed by others in Suffolk County will be collected in order to generate a trends analysis. These include NYSDEC, USACOE, and NYSDOS efforts and earlier trends analyses. Workgroup studies for the Peconic and South Shore Estuary Programs and LISS have also assessed existing wetlands, and made comparisons to historical records.

The study will also include the identification of some 20 or so Primary Study Sites. These sites will be selected from the GIS-mapped set of wetlands, and will be subject to special study to establish meaningful baseline monitoring data. They will be used to assess environmental effects from vector control options both over the course of the investigation and as part of the monitoring program to be developed through the Long-Term Plan. These sites will be key to developing the overall vector control wetlands management program. It is hoped that some of these sites will be especially suitable for the early action projects that will be required to fill some of the existing data gaps.

SCDHS monitoring data from the three estuary programs will be collected and assessed. These include water quality and nutrient concentration data from 51 stations in North Shore Harbors, 59 stations in the Peconic Bay complex, and 12 stations in each of Great South Bay, Moriches Bay, and Shinnecock Bay. Water quality and nutrient analyses for river and groundwater samples will also be analyzed. The County groundwater model will be accessed to aid in determining the groundwater and surface water contribution watersheds and their input to the estuarine wetland systems. The watershed concept is also an efficient means of sub-categorizing much of the GIS data, and making the Vector Control Program consistent with other data systems the County is developing.

Remote sensing tools will be utilized for habitat monitoring. The availability of historical aerial photographs will permit trend analyses of broad wetland characteristics in some of the systems. It should be possible to estimate generic wetland acreage for specific sites from historical aerials, and so determine broad trends in wetland migration and losses of acreage. Partial NYSDEC analyses of County wetlands will be accessed, and the NYSDEC protocols will be used as models.

The potential of using satellite images to establish a more sophisticated trend analysis program for the County will be explored. The IKONOS satellite, launched in 1999, provides the highest spatial resolution available on civilian satellites, and is the tool of choice for this study. The high tidal ranges on the North Shore of the County, and moderate ranges through the Peconic system, may create enough elevation-related definition in the marshes to allow for good separation of important vegetation types. The

patchiness of basic marsh archetypes along the South Shore may mean the available resolution is inadequate for careful mapping. The goal is to map high marsh, low marsh, and *Phragmites* through remote sensing.

5.3 Experiments

Recommendations for early action experimental projects will be developed based on the results of the literature review. Each project will involve extensive field measurements, sample collection, and analyses. Although such projects will not be identified until the project is underway, areas of investigation may include:

- Determine the relationship between vegetation type and mosquito propagation. Researchers have suggested that mosquitoes prefer to breed in specific types of vegetation. If so, vector control programs could be conducted more effectively by concentrating on areas where the preferred vegetation is prevalent.
- Establish and monitor a new OMWM site, including adequate measurement of pre-OMWM conditions (see other OMWM-related experiments, below).
- Determine the relationship between OMWM, ditching, and mosquito propagation utilizing County measurements of mosquito populations in areas with no ditches, unmodified ditches, and ditches modified in various manners, as well as areas that have been subjected to other OMWM techniques.
- Test the efficacy of various mosquito traps. The most effective traps could be used as part of other early action projects.
- Examine mosquito migration paths. It has been suggested that mosquitoes follow defined migration paths from marshes to populated areas. If so, mosquito traps could be deployed more effectively to intercept them.
- Determine the potential impact of OMWM techniques on insectivorous fish species.
- Examine the relationship between marsh health and OMWM to determine if OMWM has had any short-term impacts on marsh health in areas where it has been implemented (proper assessment of long-term effects extends beyond the time frame of this project).
- Conduct field tests of the acute toxicity of various insecticides, using caged fish.
- Continue to monitor surface waters for evidence of currently-used insecticides and their metabolites.
- Investigate the potential for pesticide transport via groundwater to surface waters.
- Expand the monitoring efforts to certain sensitive marine receptors (such as mussels or other benthic organisms).

Again, it is to be emphasized that many of these experiments will only produce preliminary data over the limited time span allotted for the completion of the DGEIS. Because the EIS process is being conducted in concert with the management plan process, some of the actions that are being taken may not achieve complete fruition for the EIS. This is especially true of wetlands manipulations, where the appropriate time scale to measure impacts may actually be a decade or more. However, the completion

of the DGEIS is not to be contingent on the development of a complete and exhaustive data set on the potential impacts. The DGEIS will be submitted on the basis of information gathered over the approximate two-year time scale set aside for the process. However, the management plan process, as information required to form decisions is augmented by continuing monitoring activities, has no current deadline, and so will continue indefinitely.

5.4 Risk Analysis

Information pertinent to assessing risk will be researched with respect to both human health impacts and impacts to the ecosystem. Information gathered will also be applied to a no-action scenario assuming no vector control activities, but incorporating pesticide applications that are made outside of the control of Suffolk County.

Research into the human health aspects of mosquito-borne pathogens will be investigated, including current literature that addresses the prevalence and spread of these diseases. Infection, disease, hospitalization and mortality rates will be documented, where possible, to develop a human health risk associated with common mosquito-borne diseases for Suffolk County.

The potential toxic effects of adulticides and larvicides on human health and the environment will also be investigated. The goal will be to assess risk posed by vector control chemical applications, with regard to the choice of formulations applied, and the methods and rates of their applications.

The prime basis for the investigation will be the toxicological information obtained through the literature review and from interviews with the New York State Department of Health and other agencies. Much of the literature included in this review will be derived from previous EIS work conducted by New York City and Westchester County. This information will be supplemented by studies and reports that have been published since those EISs were conducted. Additionally, a literature search will be conducted to identify information on the potential human and ecological toxicity of adulticide and larvicide degradation and environmental transformation products, which was not part of the previous EISs. This work will be supplemented by an evaluation of the potential impacts of vector control pesticides on breast cancer and similar diseases believed to have a major environmental cause component.

Terrestrial wildlife that is potentially impacted by adulticides includes some mammals, birds, and insects. Aquatic receptors include fish, crustaceans, aquatic insect larvae, mollusks, and amphibians. These organisms can be exposed directly to the spraying, or from application drift transported to ponds, streams, and wetlands through the air or from runoff. Secondary exposure can also occur through terrestrial and aquatic food chains. A literature search will be conducted to identify recent relevant data from the peer-

reviewed literature, government reports, dissertations, and other available sources. As discussed above, information on the toxicity of degradation and transformation products will be identified.

6. Initial Identification of Mitigation Measures

Mitigation is defined under the SEQRA regulations as a way to avoid or minimize environmental impacts. Since the components that will comprise the County Long-Term Plan for mosquito control are not presently known, and will be developed by means of a management planning process which will be initiated once this scoping document and the project work plan have been finalized, it is not possible at this time to identify the measures that will constitute mitigation for this action.

Notwithstanding the foregoing, it is important to recognize that the Long-Term Plan which ultimately evolves from this planning process will be consensus-driven. This will ensure that important environmental concerns that have been raised by involved regulatory agencies, technical experts, and concerned citizens are appropriately addressed directly in the plan itself. Therefore, it is expected that the selected plan will in large part be designed with the specific goal of mitigating to the maximum extent practicable environmental impacts associated with various mosquito control techniques that are available to the County, including pesticide application and marsh management. In other words, suitable mitigation measures will be an integral part of the County long-term strategy for mosquito control. The DGEIS will identify each such measure that is to be included in the selected Long-Term Plan, and will describe in specific terms the manner in which these measures will mitigate known or potential environmental impacts.

7. Reasonable Alternatives to be Considered

Based on a thorough review of the County's existing Vector Control Program and examination of control programs in other jurisdictions, reasonable alternatives to mosquito management in Suffolk County will be evaluated. This will include an analysis of the no-action alternative, where the County implements no vector control. The no-action alternative would include pesticide applications that are performed both privately and commercially outside of the control of the County.

The advisability of pursuing any particular alternative would be determined according to its:

- Effectiveness in controlling mosquito populations
- Public/environmental health implications
- Environmental advantages/disadvantages
- Implementation feasibility
- Cost/benefit implications
- Financial implications
- Long-term institutional coordination and oversight options
- Options for long-term monitoring

Depending on the vector control approach selected as the preferred plan, alternatives that would be evaluated may include:

- Continuation of the County's current program
- No use of pesticides, with active marsh management
- Alternate application rates and techniques for all chemicals and processes
- Alternate chemicals from those traditionally utilized for vector control (e.g., garlic oil)
- Alternate management tools including biota (e.g., fish, birds, bats) and traps
- Alternate water management techniques (reversion and ditch plugging vs. OMWM and ditch maintenance, for example)

This is given as an example of the sort of alternatives review that will be generated. The final list of alternatives will be developed after the research of existing information and completion of field studies.

There are generally fewer environmental impacts from early intervention with natural and biological controls as compared to later, artificial, chemical, and more widespread techniques. Therefore, the review of alternatives will strongly emphasize a preference for source-reduction programs that abate mosquito populations and programs with a major surveillance component. These alternatives enable targeted, minimized control.

The alternatives section will include a review of common highway maintenance

procedures for storm sewers and catch basins to ensure that the best mosquito management control procedures are in place. The alternatives addressed here may include new approaches to the management of recharge basins and other stormwater retention-detention structures. Many mosquito control agencies in Florida, for example, have had good results controlling mosquitoes associated with stormwater impoundments with minimal or no adverse environmental impacts.

8. Environmental Parameters Determined to be Non-Significant

The following is a list of environmental parameters that are identified in the SEQR Scoping Checklist (Appendix D of the old SEQR regulations, 6 NYCRR §617.21), but which it has been determined will not be significantly affected with respect to the Suffolk County Vector Control and Wetlands Management Long-Term Plan, and which will not be addressed in the DGEIS:

- Transportation;
- Community services (educational facilities, police protection, fire protection, social services, utilities, solid waste disposal, and sewage disposal); and,
- Historic and archeological resources.

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    - **4.2.3.1.1** General presence of contaminants
    - **4.2.3.1.2** Presence of VC chemicals

4.3 Air Resources

- **4.3.1** Air quality
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5 LEGAL AND REGULATORY SETTING

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5.2 State Authority

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- **5.2.2** DOH - Human health
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5.3 County Authority

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    - **6.1.1.1.3** Impact on incidence of mosquito-borne diseases (infections, hospitalizations, and deaths)
  - **6.1.1.2** Larvicides
    - **6.1.1.2.1** Impact on general population health
    - **6.1.1.2.2** Impact on health of sensitive subpopulations *(e.g.* elderly and children)
    - **6.1.1.2.3** Impact on incidence of mosquito-borne diseases (infections, hospitalizations, and deaths)
- **6.1.2** Impact of trapping and other non-chemical control techniques
  - **6.1.2.1** Impact on general population health
  - **6.1.2.2** Impact on health of sensitive subpopulations *(e.g.* elderly and children)
  - **6.1.2.3** Impact on incidence of mosquito-borne diseases (infections, hospitalizations, and deaths)

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6.2.5.3 Mosquito predators (species, life histories, distribution)

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7 MITIGATION MEASURES (Content will depend upon the components that are to be included in the Long-Term Plan, which have not yet been determined)

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